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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/762,658

01/22/2004

Dean Z. Tsang

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5151

7590

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EXAMINER

PHAM, LONG

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/762,658

Applicant(s)

DEAN TSANG

Examiner

Long Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>05/27/04</u> . | 6) <input checked="" type="checkbox"/> Other: <u>Labeled drawings</u> . |

DETAILED ACTION

General Information

The labeled drawing sheet(s) of the present invention are attached to show examiner's understanding of the disclosed and claimed inventions.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 6, and 7 are rejected under 35 U.S.C. 102(a) as being anticipated by Misewich et al. (US 6,365,913).

With respect to claim 1, Misewich et al. teach a transistor device comprising (see claims 1-40 and associated figures):

a source;

a drain;

a gate;

a metal channel or channel layer;

With respect to claims 6 and 7, Misewich et al. further teach that the transistor comprises of an enhancement or depletion mode device. See col. 1, lines 57-64.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious

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at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim Rejections - 35 USC § 103

4. Claims 2, 3, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Misewich et al. (US 6,365,913) as applied to claims 1, 6, and 7 above, and further in view of Chu et al. (US 2004/0227154)

With respect to claims 4 and 5, Misewich et al. fail to teach the ranges for the thicknesses of the channel layer.

Chu et al. teach a MOS device in which the thickness of channel is between 1.5 to 2.0 nm . See [0050].

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to use the range for the thickness of channel of Chu et al. in the device of Misewich et al. to achieve enhanced hole mobilities. See [0050].

With respect to claim 3, the use of silicon as substrate material is well-known.

With respect to claim 2, Misewich et al. fail to teach that the channel is located between a gate insulator and an insulator.

However, the formation of a channel over a SOI substrate (including an insulator) and a gate insulator over the channel is well-known.

5. Claims 8, 9, 10, 11, 12, 13, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wei et al. (US 2004/0169227 in combination with Misewich et al. (US 6,365,913), Song et al. (US 2004/0149679), and Ogura et al. (US 2002/0045319).

With respect to claim 8, Wei et al. teach a field effect transistor comprising (see figs. 1 and 2A-2B and associated text):

a channel 33 over an insulator 30B;

a source and a drain 52; and

a gate 36 and a gate insulator 34 over the channel.

Wei et al. fail to teach that the channel is made of metal.

Misewich et al. teach channel made of metal to attain high density memory device. See claims 1-40 and col. 5, lines 60-62.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to use metal as channel material to obtain above advantage.

With respect to claim 9, Wei et al. further teach the insulator further comprises an insulating layer 30B over a substrate 30A, the channel being positioned between the gate and the insulating layer and the gate insulator being positioned under the gate and over the channel.

With respect to claim 10, the use of silicon as substrate material is well-known.

With respect to claim 11, Wei et al. fail to teach the range for the thickness of the channel layer.

Chu et al. teach a MOS device in which the thickness of channel is between 1.5 to 2.0 nm . See [0050].

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to use the range for the thickness of channel of Chu et al. in the device of Wei et al. to achieve enhanced hole mobilities. See [0050].

With respect to claim 12, Wei et al. further teach the device comprises of a CMOS device. See [0007].

With respect to claim 13, Wei et al. further teach an encapsulation layer 21. See fig. 1.

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With respect to claim 14, Wei et al. fail to teach the range for the width of the channel.

Song et al. teach a channel having width of less 500 nm. See claim 4.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to use the range for width of the channel of Song et al. in the device of Wei et al. to achieve the benefit of controlling current flow through the channel by controlling the voltage applied across the channel. See [0005].

Further with respect to claim 14, Wei et al. fail to teach the range of the length of the channel.

Ogura et al. teach a channel having a length of 40 nm to reduce voltage and increase speed. See [0024].

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to use the length of the channel of Ogura et al. in the device of Wei et al. to achieve above advantage.

With respect to claim 15, the formation of channel having plurality of layers is well-known.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on M-F, 7:30AM-3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Long Pham

Primary Examiner

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LP